SPRAY GUN, PAINT, HEAVY DUTY PRESSURE FEED

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. Scope

1.1 Scope. This specification covers Pressure Feed, Heavy Duty, Paint Spray Gun assemblies, including the gun, cup, gages, regulator and valves, here after referred to as spray gun.

2. APPLICABLE DOCUMENTS

2.1 Government documents

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issue of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

TT-E-489	- Enamel, Alkyd, Gloss (For Exterior and Interior Surfaces)
PPP-B-601	- Boxes, Wood, Cleated-Plywood
PPP-B-621	- Boxes, Wood, Nailed and Lock-Corner
PPP-B-636	- Box, Shipping, Fiberboard
PPP-F-320	- Fiberboard: Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes
PPP-T-76	Tape, Packaging Paper (For Carton Sealing)

MILITARY

MIL-P-23377	- Primer Coatings: Epoxy-Polymide Chemical and Solvent Resistant
MIL-C-46168	- Coating, Aliphatic Polyurethane, Chemical Agent Resistant

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Armament Research and Development Engineering Center, ATTN: SMCAR-EST-S, Rock Island, IL 61299-7300 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MIL-P-52192 - Primer Coating, Epoxy
MIL-T-81772 - Thinner, Aircraft Coating

STANDARDS

FEDERAL

FED-STD-H28 - Screw-Thread Standards For Federal Services

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking For Shipment and Storage
MIL-STD-130 - Identification Marking of US Military Property
MIL-STD-889 - Dissimilar Metals
MIL-STD-1190 - Minimum Guidelines For Level C Preservation, Packing and Marking

(Copies of specifications, standards, handbooks, drawings, and publications required by contractors in connection with specific acquisition functions should be obtiined from the contracting activity or as directed by the contracting officer.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specification specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.2.l and 6.2.1).

3.2 Design and construction. The spray gun shall be a complete functional assembly consisting of the gun, cup, gages, regulator, valves, gaskets, "O" rings, bushings and seals. The spray gun shall be new and of the manufacturer's current commercial design. The spray gun shall be designed for heavy duty commercial/industrial production use. The spray gun shall be for hand held operation and designed with an air pressure fluid material atomizing/mixing air cap. The spray gun shall be designed for pressure feed. The spray gun shall be designed and constructed to facilitate its complete disassembly and reassembly for cleaning and repair using simple hand tools, without damaging the spray gun and all spray gun component The spray gun shall contain no burrs, slivers, or galling of the interior and exterior surfaces of the air and fluid passages before, during, and after each disassembly and reassembly. The spray gun and its components shall be constructed of materials which are chemically compatible with the coatings, enamels, lacquers, paints, solvents and thinners encountered during life cycle use and cleaning of the spray gun. Materials which are chemically compatible shall be those materials that will not deteriorate or otherwise reduce life cycle operational functions/characteristics. The internal orifice of the fluid nozzle shall be

centered to the functional exterior surface of the fluid nozzle within plus/minus 0.001 inch. The annular radial opening between the center hole of the air cap and the functional external surface of the fluid nozzle, shall not deviate more than 0.0015 inch when measured around the annular radial opening (see Figure 4, 3.13.4 and 3.13.5). The spray gun shall include a pop-off pressure safety relief valve (see 3.13.2).

3.3 Interchangeability. All parts of the spray gun shall be manufactured to definite standards and tolerances. All respective parts of the spray gun shall be interchangeable without requiring modification of the part or its mating components. All parts subject to possible future replacement shall be assigned a manufacturer's part number and shall be identified in the repair parts manual. All replacement parts shall provide the same or better form, fit, function, and performance as the parts provided or initially installed in the end item.

3.4 Material. All parts of the spray gun shall be fabricated from new materials. In no event shall such processes as welding, peening, or filling with cold solders or metallic pastes be used for reclaiming any parts of the spray gun. All spray gun parts, except the gun body, in contact with the sprayable materials (see 3.7.1) shall be fabricated of bronze, brass, or stainless steel.

3.4.1 Dissimilar materials. Contact between dissimilar metals shall be avoided wherever possible on the spray gun and all accessory and ancillary equipment. When such contact cannot be avoided, suitable protection against corrosion shall be applied in accordance with MIL-STD-899.

3.4.2 Threaded aluminum interfacing. Threaded aluminum/aluminum alloy parts or components of the spray gun shall not be screwed, fastened, or affixed to the male/female threaded aluminum parts of components. Oxidation and corrosion of mating (male/female) threads and fasteners provides for physical bonding Of the aluminum alloy materials, which interferes with and prevents, disassembly and reassembly of the spray gun without damage and degradation.

3.5 Threads. The design, manufacture and configuration of threads shall conform to FED-STD-H28 and the applicable detailed standards referenced therein.

3.6 Gaskets, O-rings, bushings, seals. The spray gun shall include gaskets/O-rings/bushings/or other seals herein referred to as "gaskets" to assure that there are no internal or external air, paint, or mixture leakages. All gaskets, O-rings, seals, and bushings contained in or provided with the spray gun shall be composed of materials which will not undergo mechanical or chemical degradation after repeated and prolonged exposure to coatings, enamels, lacquers, paints, thinners, and solvents. Non-mechanical seals, such as glues, epoxies and anaerobic shall be prohibited for use as sealants in the spray gun.

3.7 Performance and product characteristics. The spray gun shall be complete so that the spray gun can be used for any operation specified herein.

3.7.1 Sprayable material. The spray gun shall be capable of spraying liquid materials such as enamels, lacquers, primers, shellacs, varnishes, polyurethanes, stains, paints, and the two part aliphatic polyurethane coatings, conforming to MIL-P-52192, MIL-P-23377, MIL-C-46168, and MIL-T-81772, which have been thinned to a viscosity of 25 to 30 seconds using a Number 4 Ford cup at +77 degrees Fahrenheit (F) plus/minus 5 degrees F. The spray gun shall satisfactorily spray the materials on metal surfaces, placed at any orientation to the operator, including overhead.

3.7.2 Sprayable material finish. The spray gun shall provide the capability to apply black to charcoal color pigmented acrylic paint over a 3 feet by 3 feet square area with a coating finish equal to or better than the commercial automotive passenger car finish provided by General Motors, Ford, Chrysler, and American Motors (see Figure 3).

3.7.3 Spray pattern. The spray guns shall produce a round pattern with the pattern control valve closed, and a symmetrical fan spiny pattern with the pattern control valve open (see Figure 1). The minimum effective dimensions of the spray pattern shall be that area of the pattern which has 100 percent coverage. The spray guns shall not produce any defective patterns as shown in Figure 2, namely a heavy bottom or top pattern, a heavy left or right side pattern, or a heavy center, or split pattern. The spray pattern shall not change in shape when the air cap is rotated. The spray guns, when filled with a pigmented alkyd gloss enamel exterior automotive paint conforming to TT-E-489 Type I, Class A, black to charcoal in color, having a viscosity of 25 to 30 seconds using a Number 4 Ford cup at +77 degrees F. plus/minus 5 degrees F., shall produce the symmetrical fan and round spray pattern as specified in Table I without any paint runs within the pattern area, when held stationary and perpendicular to the spraying surface at a distance of 7.5 to 8.5 inches inclusive and operate for not more than one second. In accordance with 3.2, the spray gun shall produce round and symmetrical spray patterns, in accordance with Figure 1; then, the spray gun shall be completely disassembled and thoroughly cleaned and all packing, gaskets, and other seals, shall be replaced. The spray gun shall be reassembled and retested for the round and symmetrical spray patterns in accordance with Figure 1.

TABLE I. Spray Pattern Size

Minimum Effective Dimensions of Fan Spray Patterns:
Major Axis: 9 inches
Minor Axis: 2 inches
Minimum Effective Diameter of Round Spray Patterns:
2 inches

3.8 Air consumption and fluid pressure.

3.8.1 Air consumption. The spray guns shall produce the normal spray patterns specified in Figure 1 and 3.7.3 within the air consumption, liquid flow, and air pressure limits specified in Table II.

TABLE II: Air Consumption and Pressure and Fluid Volume

Air volume: 7-8 cubic feet per minute (CFM)*
Air Pressure: 55 to 65 pounds per square inch
Fluid Flow: At least 14.5 ounces per minute

* The volume of air flow shall be corrected to 29.92 inches of mercury standard barometric pressure and +70 degrees F.

3.8.2 Liquid pressure. The spray gun shall produce the spray patterns as specified (see Figure I and 3.7.3) at liquid pressure of not more than 20 pounds-force per square inch gage (psig).

3.9 Impact resistant. The spray gun, with the one quart cup removed and with the nozzle and connections protected shall withstand being dropped six times through a free fall of not less than six feet to a concrete floor without damage or deformation to the spray gun or any of its parts or components sufficient to degrade the performance operation specified herein of the spray gun.

3.10 Operational endurance. The spray gun and all components shall withstand without damage or deformation, and perform satisfactorily as specified herein, after 10,000 actuations (full trigger strokes) of the spray gun trigger while under 55 to 65 psig.

3.10.1 Hydrostatic pressure. The spray gun, with the one quart cup removed, shall withstand, without damage or deformation, and perfom satisfactorily (see 3.7). after a hydrostatic pressure of not less than 250 psig for not less than one (1) minute. After being subjected to this hydrostatic pressure, the spray gun, with the one quart cup removed, shall meet or exceed the air leakage requirements (3.12.1 to 3.12.4).

3.11 Use simulation requirement. In accordance with 3.2 and 3.7.3, the spray gun shall complete fifty (50) spraying cycles with a five (5) minute interruption at mid-point in the fifty (50) cycle test to simulate actual use condition with a pigmented alkyd gloss enamel exterior automotive paint conforming to TT-E-489 Type I, Class A. A spraying cycle shall be defined as: a single pull (engagement) of the spray gun trigger which results in the following sequential events: 1) The air valve opening to permit air passage through the spray gun, 2) the liquid material valve opening to permit the passage of air and enamel through the spray gun, 3) the deactivation (disengagement) of the spray gun trigger which shall close the liquid material valve to prevent the passage of liquid material through the spray gun, 4) not less than five (5) seconds nor more than ten (10) seconds shall elapse from the the the liquid material valve is opened until the liquid material valve is closed, 5) the liquid material valve shall remain closed (spray gun passing air but not spraying liquid) for not less than fifteen (15) seconds.

3.12 Air leakage requirements. The spray gun shall meet or exceed the air leakage requirements of (see 3.12.1 to 3.12.2).

3.12.1 Air leakage requirement No. 1. When the following pre-conditions have been fulfilled (see pre-conditions a., b., and c. below), the spray gun shall not be damaged or deformed after being subjected to air pressure of not less than 100 psig for not less than two (2) minutes. When the air pressure source is shut off by a supply line valve to isolate the air pressure captured in the spray gun, the captured air pressure, 100 psig or more, in the isolated spray gun shall not drop more than ten (10) psig in not less than one (1) minute.

Pre-conditions of Air Leakage Requirement No. 1:

a. Remove the spray gun cup, the material inlet connection shall be capped, plugged, or blocked to prevent the escape of air through the material inlet connection.

b. The spray gun trigger shall not be activated.

c. The air and liquid material valves shall be closed to prevent the passage of air and liquid material within the spray gun body.

3.12.2 Air leakage requirement No. 2. When the following pre-conditions have been fulfilled (see pre-conditions a. to f. below), the spray gun shall not be damaged or deformed after being subjected to air pressure of not less than 100 psig for not less than two (2) minutes. When the air pressure supply source is shut off by a supply line valve adjacent/at the gun to isolate the air pressure captured in the spray gun and cup assembly, the captured air pressure, 100 psig or more, in the isolated spray gun and cup assembly shall not drop more than ten (10) psig in not less than one (1) minute.

Pre-conditions of Air Leakage Requirement No. 2:

a. Remove the spray gun cup, the material inlet connection shall be capped, plugged, or blocked to prevent the escape of air through the material inlet connection.

b. The spray trigger shall be in a fully activated position.

c. The air cap shall be capped, plugged, or blocked to prevent the escape of liquid material through the liquid material exit orifice.

d. The air cap shall be capped, plugged, or blocked to prevent the escape of air through the air exit ports.

e. The air valve shall be open to permit the passage of air through the body of the spray gun.

f. The liquid material valve shall be open to permit the passage of liquid material through the body of the spray gun.

3.13 Detail of components. The spray gun shall consist of, but not be limited to, the following components.

3.13.1 Spray gun body. The spray gun body shall be a heavy duty forged aluminum alloy and shall be free of defects that may affect serviceability or performance, i.e., fins, scale, inclusions, cold shuts, mismatching, etc. The gun body shall have a polished exterior surface. A hook shall be provided at the top of the body for hanging the gun when not in use.

3.13.2 Spray gun cup. A heavy duty one quart capacity, attachable stainless steel or aluminum alloy body pressure feed spray gun cup shall be provided with each spray gun, hereafter referred to as the "cup". The cup lid shall include an air regulator an air regulator adjustment, a fine air flow volume adjustment valve and an air pressure gage. A pop-off pressure safety relief valve, vented to atmosphere, shall be mounted on the spray gun cup lid or at the base of the spray gun handle. The air regulator shall be capable of regulating the air pressure inside the cup within 5 psig at any point within the full range scale of the cup air pressure gage. The cup air pressure gage shall display an air pressure range from no less than 0 to 50 psig and no more than 0 to 60 psig. The gage shall be accurate to three (3) psig throughout its full range, or shall be accurate throughout the full range at five (5) percent of the mid-scale value. The cup shall have a stainless steel or aluminum alloy, reinforcing ring permanently attached to exterior bottom of the cup. This exterior reinforcing ring as defined above, shall continue not less than 0.625 inch up the outside of the cup and may have a circular opening centered on the

bottom exterior of the cup no larger than one (1) inch diameter. The exterior reinforcing ring shall be at least .023 inch thick. The cup interior shall have a sixty-three (63) microinch or finer arithmetical average (AA) surface roughness and shall contain no burrs or slivers. The cup shall be capable of withstanding internal air pressure of 50 psig for a period of not less than two (2) minutes without a pressure drop of more than 2 psig. The pop-off pressure safety relief valve shall have a pressure release point of not less than 50 psig and not more than 60 psig. The pop-off pressure safety relief valve shall automatically reset itself to the same release point immediately upon reduction of pressure below this release point as defined above. The material wall thickness of the spray gun cup shall be at least 0.040 inch.

3.13.3 Spray head. The spray head shall be fabricated from brass or bronze base metal and shall be of the detachable type. The head shall be accurately machined to provide correct alignment and support of the nozzle components. The interior and exterior surfaces shall be smooth and finished with a chromium or nickel plating.

3.13.4 Air Cap. The air cap shall be fabricated from brass or bronze base metal. The cap shall have smooth exterior and interior surface which is chromium or nickel plated. The air cap shall be self-centering and shall be fitted to the spray head with a retainer ring or other suitable means. The internal orifice of the fluid nozzle must be centered to the functional exterior surface of the fluid nozzle within plus/minus 0.001 inch. The annular radial opening between the center hole of the air cap and the functional external surface of the fluid nozzle, shall not deviate more than 0.0015 inch when measured around the annular radial opening (see Figure 4, 3.2 and 3.13.5).

3.13.5 Fluid nozzle. The fluid nozzle shall be fabricated from stainless steel base metal and shall have a Rockwell C hardness of 48-60. The fluid nozzle shall be ground or lapped on all seating surfaces and air passages. The fluid nozzle assembly shall be removable to facilitate cleaning and repair. The internal orifice of the fluid nozzle must be centered to the functional exterior surface of the fluid nozzle within plus/minus 0.001 inch. The annular radial opening between the center hole of the air cap and the functional external surface of the fluid nozzle, shall not deviate more than 0.0015 inch when measured around the annular radial opening (see Figure 4, 3.2 and 3.13.4).

3.13.6 Valves. All valves shall be replaceable.

3.13.6.1 Liquid material valve. The trigger operated liquid material valve shall be a stainless steel needle-type valve. The valve shall be ground on the seating surfaces. The needle valve packing shall be of chromed treated leather, fiber, or synthetic material. The valve shall be connected with an adjustable screw mounted at the back of the gun to permit changing the quantity of liquid material passage through the fluid orifice when the valve is opened. Packing shall be impervious to degradation from coatings, enamels, lacquers, paints, solvents and thinners. The liquid material valve shall be self-closing when the trigger is released.

3.13.6.2 Air valves. The trigger operated air valve shall be a cartridge-type valve or a type employing a replaceable valve seat. The valve stem packing shall be chromel treated leather, fiber, or synthetic material. The air valve shall be self-closing when the trigger is released.

3.13.6.3 Pattern control valve. A spray pattern control valve, to be easily operated from the back of the gun, shall be provided to infinitely adjust and change the spray pattern from round to fan shaped, or vice versa (see Figure 1).

3.13.7 Trigger. The trigger shall be designed for multiple finger control, with the normal, not operator adjusted, position closed. The trigger control shall operate freely with a positive action, 4 to 7 pound pull, and shall be located in front of the handle grip. The trigger shall control both the air valve and the liquid material valve, and shall operate to permit air flow before liquid material flow, and liquid material flow shut-off before air flow shut-off. The trigger shall be fabricated of corrosion resistant metal, or metal plated to resist corrosion. The trigger shall be provided with hardened surfaces to resist wear at points of contact with the air valve stem and liquid material valve sleeve or stem.

3.13.8 Connections. The spray gun shall be provided with liquid material and air connections. The connection for the liquid material shall be 0.375 inch National Pipe Straight Mechanical (NPSM) male thread with a thirty (30) degree internal tapered seat, and the connection of the air hose shall be a 0.250 inch NPSM male thread with thirty (30) degree internal tapered seat. The air connection shall be detachable and fabricated from drawn brass rod. The air hose connection shall be located in the butt of the handle grip. The liquid material connection shall be located underneath the spray gun head and so positioned as to allow attaching the Spray gun cup.

3.14 Identification marking. In accordance with MIL-STD-130, the National Stock Number (NSN) shall be legibly and permanently marked, stamped, embossed, or forged on the spray gun body but not on the pressure cup.

3.15 Workmanship. The quality of workmanship imparted to the item and all of its components shall equal or exceed that typically provided to commercial products by domestic producers of the type of item addressed herein. The items presented for acceptance shall have been manufactured with skill and care; shall be uniform, neat, and clean; and shall be free of irregularities and anomalies which degrade form, fit, function, performance or appearance.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of Sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective materiel, either indicated or actual, nor does it commit the Government to acceptance of defective materiel.

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2.1).

b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. First article inspection shall be performed on the preproduction model(s) or initial production item(s) (see 3.1). Unless otherwise specified (see 6.2.1), first article inspection shall consist of the product examination (see 4.3), and tests (see 4.4). Failure of the first article to pass the examination or any of the tests shall be cause for rejection.

4.2.2 Quality conformance inspection. Unless otherwise specified (see 6.2.1), quality conformance inspection shall be applied to production units offered for acceptance under the contract. Unless otherwise specified (see 6.2.1), quality conformance inspection shall consist of a. through e. as follows, and failure of any unit to pass an examination or test shall be cause for rejection of the unit.

a. Product examination (see 4.3).

b. Hardness test (see 4.4.1).

c. Leak tests (see 4.4.2).

d. Performance tests (see 4.4.3).

e. Packaging inspection (see 4.5).

4.2.2.1 Sampling Sampling for quality conformance inspection shall be performed in accordance with MIL-STD-105, using the following:

INSPECTION/TEST	LEVEL	AQL
Product examination (see 4.3)	II	1.0
Hardness test (see 4.4.1)	S-4	1.0
Leak tests (see 4.4.2)	II	1.0
Performance tests (see 4.4.3)	II	1.0
Packaging inspection (see 4.5)	S-4	4.0

NOTE: Lot size shall be no more than 150 spray guns.

4.3 Product examination. The spray gun shall be visually and manually examined to determine conformance with the requirements (see 3.2 through 3.6 and 3.13 through 3.15). Visual examinations shall include verification of completeness of manufacture and assembly, conformance to specified standards, adequacy of markings, proper cleaning, and freedom from the identified defects. Manual examinations shall include the operation of movable parts by hand to assure proper functioning. The examination provisions may be applied at the earliest practical point in manufacture at which it is feasible to inspect for acceptance without risk of change in the characteristic by subsequent operations. Failure of the contractor to provide objective evidence that the spray gun and their components have passed the examinations prescribed for them by the contractor's inspection system shall be cause for rejection. In addition, failure of the contractor to provide objective evidence that all parts are manufactured to definite standards, clearances, and tolerances so that no replacement part will degrade the form, fit, or function of the end item (see 3.3), shall be cause for rejection.

4.4 Tests. All tests are to be performed in the order given.

4.4.1 Hardness test. The spray gun fluid nozzle shall be tested for hardness on a non-sealing surface. Failure of the nozzle to display a Rockwell C hardness of 48 to 60 shall be cause for rejection (see 3.13.5).

4.4.2 Leak tests. For the following tests, the spray gun shall be connected in series with an air pressure gage and a leak-free shut-off valve to a source of compressed air. The air pressure gage shall be located between the shut-off valve and the spray gun, and the assembly shall be as direct and compact as possible to minimize the volume of air which can be entrapped between the shut-off valve and the Spray gun. The pressure gage shall be accurate within one percent of reading over the range of 75 to 125 psig and readable to the nearest psig. The gage shall be calibrated, traceable to a National Bureau of Standards. The source of compressed air shall be capable of providing regulated pressures of from 0 to 100 psig or more (see 3.12).

4.4.2.1 Cup leak test. With the spray gun in fully operating condition the spray gun shall be supplied with compressed air at a pressure of 45 to 50 psig. The cup pressure regulator adjustment(s) and the spiny gun trigger shall then be manipulated as necessary to verify the ability of the cup pressure regulator to provide and maintain pressurization of the cup within 5 psig of any chosen point within the full range sale of the cup air pressure gage. The force required to fully depress the trigger shall then be measured. The cup pressure shall then be set at 50 psig and the shut-off valve closed with the spray gun trigger in the normal (valves closed) position. The cup pressure gage shall then be observed for a period of not less than two minutes (see 3.13.2). Occurrence of any of the following during the test shall be cause for rejection:

a. Visible damage to or deformation of any part of the spray gun.

b. Failure of the cup pressure regulator to provide and maintain cup pressure within 5 psig of any nominal point within the stated ranges, both with the trigger in the normal position and in the fully depressed position.

c. Air leakage from the cup sufficient to cause a drop in pressure of more than 2 psig during the two minute period.

d. Ability to fully depress the trigger with less than four pounds of force, or inability to fully depress the trigger with seven pounds of force (see 3.13.7).

4.4.2.2 Valve seat leak test. The cup shall be removed for this test. Hoses and connections from the gun to the cup shall be blocked or capped at the cup end of the hose or connection. The trigger shall remain in the normal (closed) position throughout this test. The air pressure to the gun shall be increased to no less than 100 psig and held at that pressure for no less than two minutes. At the end of the two minute period, the air supply valve shall be closed. The pressure gage shall then be observed for a period of not less than one minute. Any due to or deformation of any part of the spray gun, or any drop in air pressure of more than 10 psig during the one minute period shall be cause for rejection (see 3.12.1).

4.4.2.3 Valve packing leak test. The air and liquid ports in the nozzle and air cap shall be blocked by fitting the spray gun with a blank nozzle and air cap, or by other means employing the standard air cap retainer or connection. The cup shall be removed and the cup connections to the gun body shall be capped or blocked. The trigger shall be fully depressed throughout this test so that the air and liquid valves are both fully open. The air pressure in the gun shall then be raised to 100 psig and the shut-off valve then closed to entrap the compressed air in the spray

gun. The pressure gages shall then be observed for a period of not less than one minute. Any visible damage to or permanent deformation of any part of the spray gun, or a drop in air pressure of more than 10 psig during the one minute observation period shall be cause for rejection (see 3.12.2).

4.4.2.4 Pop-off pressure safety relief valve test. With the spray gun in fully operating condition, the spray gun shall be supplied with compressed air at a pressure of more than 60 psig. An air pressure gage shall be installed capable of measuring the air pressure in the spray gun cup. The pressure gage shall be accurate within one percent of reading over the range of 45 to 65 psig and readable to the nearest psig. The gage shall be calibrated, traceable to a National Bureau of Standards. Adjust the spray gun cup air regulator to an air pressure of 40 psig. Adjust the regulator slowly upward, carefully observing the air pressure on the gage, until the pop-off pressure safety relief activates. Record this air pressure. Failure of the pop-off pressure safety relief valve to activate at not less than 50 psig or no more than 60 psig shall be cause for rejection (see 3.13.2).

4.4.3 Performance tests.

4.4.3.1 Spray pattern. Prior to this test the contractor shall prepare the necessary quantity of pigmented alkyd enamel, black to charcoal in color and thinned to a viscosity of 25 to 30 seconds using a Number 4 Ford Cup at 77 plus/minus 5 degrees F. The weight of 14.5 fluid ounces plus/minus 1 fluid dram of the thinned alkyd enamel shall then be determined to the nearest dram avoirdupois. The spray gun shall then be filled with the thinned alkyd enamel and attached in series with an air flow meter and an air pressure gage to a source of compressed air. The flowmeter shall be calibrated for air at 29.92 inches of mercury, standard barometric pressure, and +70 degrees F.; and all readings shall be corrected for variances from those condition. The flow meter shall be calibrated, traceable to the National Bureau of Standards. It shall be accurate to within .25 cfm and readable to the nearest cfm over a range of 5 to 10 cfm. The air pressure gage shall be accurate within plus/minus 2 percent over the range of 25 to 75 psig and readable to the nearest psig. The source of compressed air shall be capable of providing regulated pressures of O to 100 psig over an air flow range of 0 to 10 cfm. The spray gun shall be adjusted for operation within the air pressure and air flow constraints of Table 11. Liquid flow rate shall be determined by weighing the spray gun to within the nearest dram avoirdupois both before and after performing a timed spray of more than one minute in duration. The spray gun shall then be operated to produce acceptable spray patterns in accordance with 3.7.3 and Figure 1 on a vertical, flat, non-porous surface, with a single burst of spray less than one second in duration for each pattern. The patterns shall include one circular pattern, two vertical fans, and two horizontal fans. The fan patterns shall be produced beginning with a vertical fan and continuing by rotating the air cap to 90, 180, and 270 degrees from the original position. The spray gun shall then be operated in the same manner to produce acceptable patterns on horizontal, flat, non-porous surfaces positioned both below the spiny gun and above the spray gun, i.e., overhead. Following the test, the spray gun shall be cleaned in accordance with the manufacturer's instructions. Failure of the spray gun to produce aceptable patterns in accordance with 3.7.3 and Figure 1 within the operating constraints of 3.8 shall be cause for rejection.

4.4.3.2 Finish. Prior to this test, the contractor shall prepare the necessary quantity of pigmented alkyd enamel, black to charcoal in color and thinned to a viscosity of 25 to 30 seconds using a Number 4 Ford Cup at 77 plus/minus 5 degrees F. The spray gun shall be filled with the thinned alkyd and adjusted for operation as needed. The spray gun shall then be operated to completely paint three flat, non-porous surfaces, each 3 feet by 3 feet; one placed horizontally below the gun, one placed vertically, and one placed horizontally above the gun, i.e., overhead.

Following this test, the gun shall be cleaned in accordance with the manufacturer's instruction (see 3.7.2). Failure of the spray gun to produce a finish which is visibly as smooth or smoother over the entire surface than the sample provided with this specification (see Figure 3) shall be cause for rejection.

4.4.4 Valve endurance test. The spray gun, without paint, shall be attached to a source of regulated compressed air and adjusted for operation in accordance with the air flow and air pressure requirements of 3.8. The spray gun trigger shall then be fully depressed and released for a total of 10,000 strokes (see 3.10). Any screws, connectors, or joints that vibrate loose during this test shall be cause for rejection. Following this test, the spray gun shall be retested in accordance with 4.4.2 through 4.4.2.3. Failure of the spray gun to retain pressure after 10,000 actuations of the trigger shall be cause for rejection.

4.4.5 Operational endurance test. The spray gun shall be filled with pigmented alkyd enamel, black to charcoal in color and thinned to a viscosity of 25 to 30 seconds using a Number 4 Ford Cup at 77 plus/minus 5 degrees F., and adjusted for operation within the air pressure and air flow requirements of Table II. The spray gun shall then be operated through 50 spraying cycles as described in 3.11, refilling the cup with alkyd enamel as needed. At the completion of the fifty cycles, and without cleaning the spray gun, the spray gun shall be retested in accordance with 4.4.3 through 4.4.3.2. Failure of the spray gun to meet the performance requirements of 3.7.2 and 3.7.3 after 50 spraying cycles shall cause for rejection.

4.4.6 Durability test. The spray gun shall be emptied of paint, the paint cup removed, and the spray gun nozzle and air connection capped or otherwise protected. The spray gun shall then be subjected to six separate free drops through a distance of at least six feet to a bare concrete floor (see 3.9). Any pbysical damage to the spray gun which precludes operation in accordance with 3.7.2 or 3.7.3, or any separation of components, shall be cause for rejection. The spray gun shall then be retested in accordance with 4.4.2 through 4.4.3.2. Occurrence of any of the following as a result of the six drops shall be cause for rejection:

a. Air leakage from the spray gun sufficient to permit a drop in pressure of more than 5 psig during any two minute period.

b. Failure of the spray gun to meet the performance requirements of 3.7.2 and 3.7.3.

c. Inability to manually reassemble the cup to the spray gun.

d. Failure of the spray gun to pass the test in 4.4.2.4.

4.4.7 Cup internal surface roughness test. The spray gun cup shall be cut in half to expose the interior surface of the cup, and the cup interior shall be cleaned of all paint residue. Determine the surface finish of the cup interior with a profilometer or surface analyzer. The cup interior surface shall be no rougher than 63 microinch arithmetic average (see 3.13.2). Failure to meet this requirement shall be cause for rejection.

4.4.8 Maintainability test. The gun shall be completely disassembled and cleaned in accordance with the manufacturer's instructions and all O-rings, gaskets, washers, packings and other seals replaced. The spray gun cup and any parts of the spray gun damaged during the durability test (see 4.4.6) shall also be replaced. The spray gun shall then be reassembled and tested in accordance with 4.4.2 through 4.4.2.3, and 4.4.5. Occurrence of any of the following shall be cause for rejection:

a. Inability to disassemble, clean, maintain, repair and reassemble the spray gun using only common hand tools.

b. Failure of the spray gun to meet the performance requirements of 3.7.

c. Air leakage from the spray gun sufficient to permit a drop in pressure in excess of 5 psig during any two minute period.

4.4.9 Hydrostatic pressure test. With the one quart cup removed, the spray gun shall be connected in series with a hydrostatic pressure gage and a leak-free hydrostatic shut-off valve to a source of hydrostatic fluid of 250 psig or more. The hydrostatic pressure gage shall be located between the shut-off valve and the spray gun, and the assembly shall be as direct and compact as possible to minimize the volume of fluid which can be entrapped between the shut-off valve and the spray gun. The pressure gage shall be accurate within one percent of the reading over the range of 225 and 275 psig and readable to the nearest psig. The gage shall be calibrated, traceable to a National Bureau of Standards. With the one quart cup removed, expose the spray gun to a hydrostatic fluid pressure of not less than 250 psig for a period of not less than one minute (see 3.10.1). After this test has been completed, retest the spray gun in accordance with 4.4.3 through 4.4.3.2. Any defamation of the spray gun, or failure to pass the tests (see 4.4.3 through 4.4.3.2) after pressurization shall be cause for rejection.

4.5 Packaging instruction. Packaging inspection shall be conducted before and after packaging the spray gun to determine compliance with the requirement of Section 5.

5 PACKAGING

5.1 Preservation. Preservation shall be level A, as specified in the contract.

5.1.1 Level A.

5.1.1.1 Cleaning and drying. All components of the spray gun and accessories shall be clean and completely dry before packaging.

5.1.1.2 Unit package. Each spiny gun unit shall be completely assembled and packaged in a fiberboard box unit container conforming to PPP-B-636, class weather-resistant. The spray gun shall be immobilized within the container by blocking or bracing provided by folded die-cut corrugated fiberboard inserts and/or corrugated or solid fiberboard blocking. Fiberboard used for blocking or bracing shall conform to PPP-F-320, class weather-resistant. Blocking or bracing when properly applied shall give support to top, bottom, sides and ends of the container. Closure of unit container shall be accomplished with water-resistant, pressure-sensitive tape conforming to PPP-T-76. All fiberboard used for container, blocking, or bracing shall have a minimum bursting strength of not less than 200 pounds.

5.1.1.3 Technical data. Technical data shall be packaged in a waterproof bag, sealed and placed inside the unit container housing the spray gun.

5.1.1.4 Intermediate container. The unit packaged spray guns may be intermediate packaged in a fiberboard box conforming to PPP-B-636, class weather-resistant. The gross weight of each container shall be governed by applicable box specification.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.2.1).

5.2.1 Level A. Spray guns packaged as specified shall be packed in a snug-fitting box conforming to PPP-B-601, overseas type or PPP-B-621, class 2. The gross weight of each container shall be governed by the limitations of the applicable box specification. Boxes shall be uniform in size and contain like quantities as near as practical.

5.2.2 Level B. Packing shall be the same as for level A except that shipping containers shall conform to PPP-B-601, domestic type, style A, B, I or J, or PPP-B-621, class 1.

5.2.3 Level C. Packing for level C shall be in accordance with MIL-STD-1190.

5.3 Marking. All marking for each unit pack, intermediate and exterior container and unitized load shall be marked in accordance with MIL-STD-129 and any special markings as required by the contract or order. Bar code marking is required and shall be in accordance with MIL-STD-129.

6 NOTES.

6.1 Intended use. This specification covers hand operated, heavy-duty spray guns intended for production use in base maintenance shops for the application of spray material by compressed air.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. First article when required (see 3.1).

c. First article inspection, if different (see 4.2.1).

d. Quality conformance inspection, if different (see 4.2.2.1).

e. Selection of level of packing required (see 5.2).

6.2.2 Contract data requirements. Required technical data such as operator's manuals, parts lists, and other instructions for operation and maintenance, as identified on a numbered DD Form 1664, should be specified on a DD Form 1423 incorporated in the contract.

6.2.3 Repair parts. Repair part identification in repair parts manuals shall include the prime contractor's name, nomenclature, part number, and price. Repair part identification in repair part manuals shall also include the original equipment/part manufacturer's (OEM) (actual part manufacturer) name, Federal Supply Code for Manufacturer's (FSCM), nomenclature, part number and price of the part used in the end item immediately after the prime contractor's part identification. Item with high mortality rates shall be so identified (see MIL-M-7298).

6.3 Subject term (key word) listing.

Pressure feed
Spray material
Spray pattern

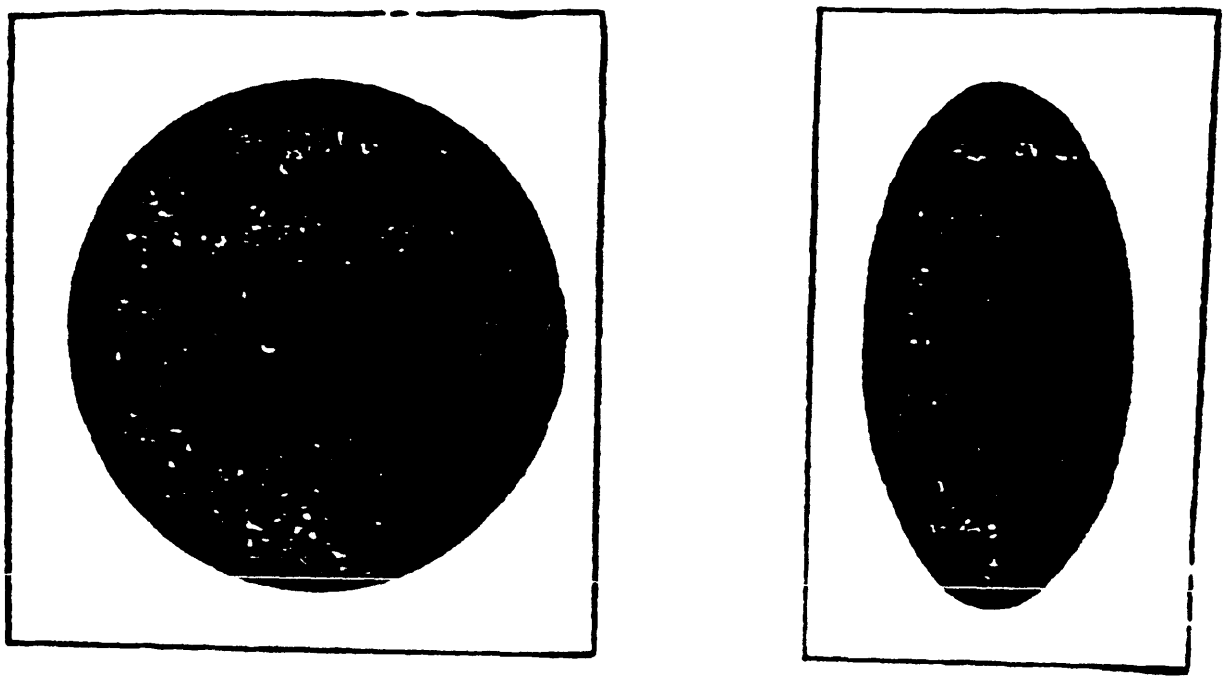
Custodian:
Army - AL
Navy - MC
Air Force - 99

Review activities:
Army - SM
Navy - S
Air Force - 82
DLA - CS

User activity:
Army - ME

Preparing activity:
Army - AL

Project No. 4940-0526



ROUND

FAN SYMMETRICAL

FIGURE 1: ACCEPTABLE SPRAY PATTERNS

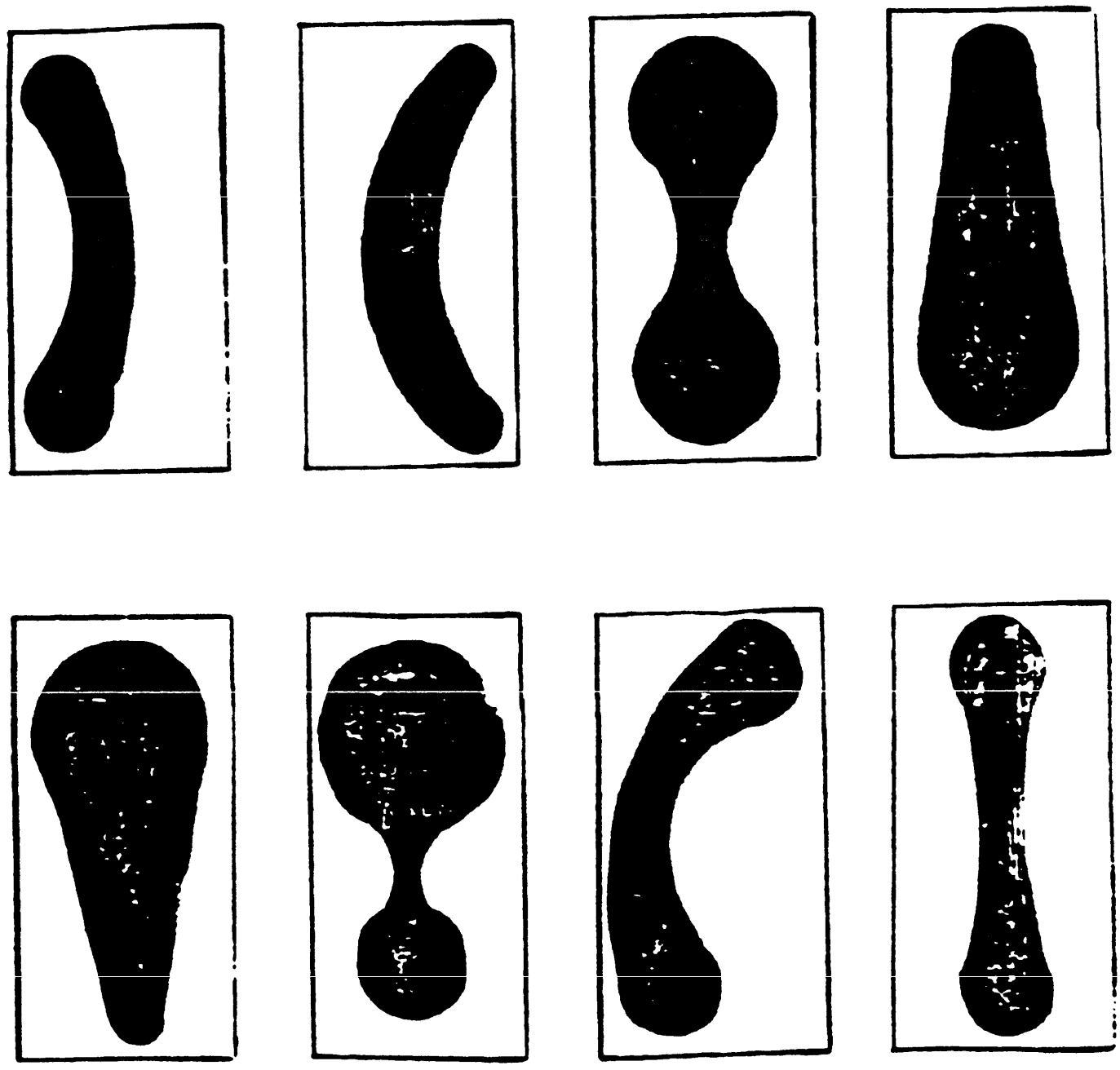


FIGURE 2: EXAMPLES OF DEFECTIVE AND UNACCEPTABLE SPRAY PATTERNS

FIGURE 3: TOP COAT FINISH SAMPLE

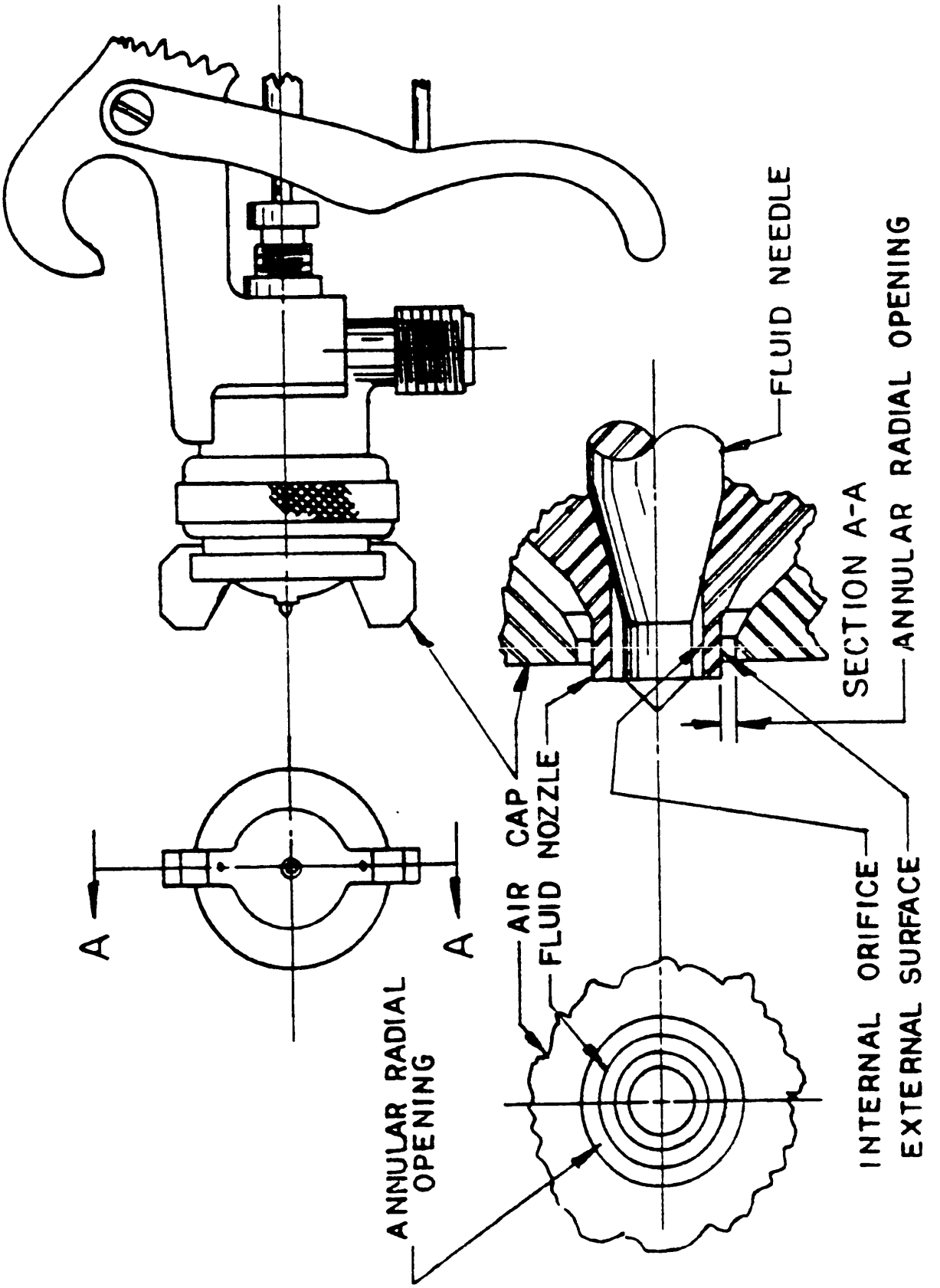

FLUID NEEDLE
SECTION A-A
ANNULAR RADIAL OPENING
AIR CAP
FLUID NOZZLE
INTERNAL ORIFICE
EXTERNAL SURFACE
A
A
ANNULAR RADIAL OPENING

FIG. 4

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	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5 PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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